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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,016	12/26/2001	Ahmad Said Ghazal	9983	2452

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EXAMINER	
WU, YICUN	
ART UNIT	**PAPER NUMBER**
2175	2

DATE MAILED: 07/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/036,016	GHAZAL ET AL.	
	Examiner	Art Unit	
	Yicun Wu	2175	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

DIANE D. MIZRAHI
PRIMARY PATENT EXAMINER
TECHNOLOGY CENTER 2100

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

III. DETAILED ACTION

1. Claims 1-49 are presented for examination.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1-49 are rejected under 35 U.S.C. 102(e) as being anticipated over Ghazal et al. (U. S. Patent No. 6,662,175).

As to claims 1, 18 and 34, Ghazal et al. discloses a method of joining a first table t, and a second table t2, each table containing rows and columns and being divided into one or more partitions, the method including:

(a) calculating a correlation function between a first correlated value column of table t, and a second correlated value column of table t2 (col. 1, lines 49-col. 3, line 53);

(b) receiving a query requesting a join between table t1 and table t2 (col. 1, lines 49-col. 3, line 53); and

(c) performing a joining algorithm, wherein the partitions containing the rows to be joined are determined based at least in part upon the correlation function (col. 1, lines 49-col. 3, line 53).

As to claims 1, 19 and 35, Ghazal et al. discloses a method

wherein (b) occurs before (a) (col. 1, lines 49-col. 3, line 53).

As to claims 3, 20 and 36, Ghazal et al. discloses a method wherein the joining algorithm comprises:

(c1) calculating, based at least in part upon the correlation function, a first number f1 and a second number f2, wherein f1 and. f2 denote the number of partitions of table t1 and table t2, respectively, to be joined (col. 1, lines 49-col. 3, line 53);

(c2) determining, based at least in part upon the correlation function, a first starting partition number PI for table t1 and a second starting partition number PZ for table t2 (col. 1, lines 49-col. 3, line 53);

(c3) joining a set of f2 partitions of table t2 starting at PZ with a set of fl partitions of table tl starting at PI (col. 1, lines 49-col. 3, line 53);

(c4) updating PI and Pz (col. 1, lines 49-col. 3, line 53).

As to claims 4, 21 and 37, Ghazal et al. discloses

a method wherein (c3) and (c4.) are repeated while at least one table has at least one active, non-eliminated partition (col. 1, lines 49-col. 3, line 53).

As to claims 5 and 22, Ghazal et al. discloses a method 5 wherein the f2 partitions to be joined in (c3) are contiguous (col. 1, lines 49-col. 3, line 53).

As to claims 6, 23 and 38, Ghazal et al. discloses a method wherein the f, partitions to be joined in (c3) are contiguous (col. 1, lines 49-col. 3, line 53).

As to claims 7, 24 and 39, Ghazal et al. discloses

a method wherein the f2 partitions to be joined in (c3) are not contiguous (col. 1, lines 49-col. 3, line 53).

As to claims 8, 25 and 40, Ghazal et al. discloses

a method wherein the fl partitions to be joined in (c3) are not contiguous (col. 1, lines 49-col. 3, line 53).

As to claims 9, 26 and 41, Ghazal et al. discloses a method, wherein the span of the f, partitions in table t1 and the span of the f2 partitions in table t2 to be joined in (c3) are increased, the method further comprises:

(c31) setting a parameter cps equal to the minimum number of inactive or eliminated partitions in (i) the span of f, partitions in table tl beginning at P1 and in (ii) the span of f2 partitions of table t2 beginning at P2 (col. 1, lines 49-col. 3, line 53);

(c32) increasing the value of f2 by eps (col. 1, lines 49-col. 3, line 53);

(c33) increasing the value of f, by eps (col. 1, lines 49-col. 3, line 53); and

(c34) after performing (c4), resetting the value of f2 equal to the value of f2 calculated in (cl) and resetting the value of fl equal to the value of fl calculated in (c 1) (col. 1, lines 49-col. 3, line 53).

As to claims 10, 27 and 43, Ghazal et al. discloses a method wherein

(c31), (c32), and (c33) are repeated if some of the partitions added in the preceding iteration of (c31), (c32), and (c33) are empty (col. 1, lines 49-col. 3, line 53).

As to claims 11, 28 and 44, Ghazal et al., discloses a method wherein the span of the f, partitions in table t, and the span of the f2 partitions in table t2 to be joined in (c3) is increased, the method further comprises:

(c31) setting a parameter cps equal to the result of the function FLOOR(x/2), wherein x is a sum of the number of inactive or eliminated partitions in the span of f1 partitions in table t1 beginning at P, and the span of f2 partitions in table t2 beginning at P2, and FLOOR(x/2) returns a largest integer that is less than or equal to x/2 (col. 1, lines 49-col. 3, line 53);

(c32) increasing the value of f_2 by eps (col. 1, lines 49-col. 3, line 53);

(c33) increasing the value of f_1 by eps (col. 1, lines 49-col. 3, line 53); and

(c34) after performing (c4), resetting the value of f2 equal to the value of f2 calculated in (e1) and resetting the value of f, equal to the value of f1 calculated in (c 1) (col. 1, lines 49-col. 3, line 53).

As to claims 12, 29 and 45, Ghazal et al., discloses a method wherein (c31), (c32), and (c33) are repeated if some of the partitions added in the preceding iteration of (c31), (c32), and (c33) are empty (col. 1, lines 49-col. 3, line 53).

As to claims 13, 30 and 46, Ghazal et al., discloses a method wherein calculating the correlation function includes:

joining table ti to table t2 using PK=FK as the join condition to produce a join result having rows, each row including a value from cvl and a value from cv2, wherein PK denotes a primary key column in table tl, FK denotes a foreign key column in table t2, cv, denotes a first correlated value column in table ti, and cv2, denotes a second correlated value column in table t2;

creating an initial running constraint (RC), the initial running constraint comprising a null range; and

producing a derived constraint rule (DCR) having the following form:

(PK = FK) CV2 + cl <_ CV l <_ CV2 + c2,

where cl and c2 are constants, and "-->" means "implies;"

by performing the following processing for each row in the join result:

computing a new constraint (NEW), having a range; and

modifying RC by merging the range of NEW with the range of RC.

As to claims 14, 31 and 47, Ghazal et al., discloses wherein the joining algorithm comprises:

(cl) calculating, based at least in part upon the correlation function, a first number fl and a second number f2, wherein fl and f2 denote the number of partitions of table tl and table t2, respectively, to be joined, wherein:

p is set equal to a size of a partition range of table t, and table t2;

pcl is set equal to the value of (SIGN(cl)*CEILING(ABS(cl)/p)), wherein SIGN(cl) returns a value of-1 if cl is less than zero, otherwise SIGN(cl) returns a value of 1, ABS(cl) returns an absolute value of cl, and

CEILING(ABS(cl)/p) returns a smallest integer that is not less than the value of ABS(cl)/p;

pct is set equal to the value of (SIGN(c2)*CEILING(ABS(c2)/p)), wherein SIGN(c2) returns a value

of -1 if c2 is less than zero, otherwise SIGN(c2) returns a value of 1, ABS(c2) returns an absolute value of c2, and

CEILING(ABS(c2)/p) returns a smallest integer that is not less than the value of ABS(cz)/p;

n is set equal to pct - pcl + 1, wherein n is a number of contiguous partitions in table tl that may have rows matching rows in a single partition of table t2;

m is a maximum number of file contexts;

f2 is set equal to the smallest integer value that is equal to or greater than the value of ((m-n)/2);

fl is set equal to n + f2 -1;

(c2) determining, based at least in part upon the correlation function, a first starting partition number Pl for table tl and a second starting partition number P2 for table t2, wherein:

P2 is set equal to a lowest partition number in table t2 such that P2 is a first active, non-eliminated partition in table t2, and at least one of the partitions in the interval between P2 - pct and P2 - pcl in table tl is an active, non-eliminated partition; Pl is set equal to P2 - pct;

(c3) joining a set of f2 partitions of table t2 starting at P2 with a set of fl partitions of table tl starting at PI;

(c4) updating P1 and P2, wherein:

PZ is set equal to a lowest partition number PZ' in table t2, wherein:

the lowest partition number P2' is greater than or equal to the sum of PZ + f2;

PZ' is a first active, non-eliminated partition;

at least one of the partitions in the interval between P2" - pct and PZ - pci in table t1 is an active, non-eliminated partition; and PI is set equal to PZ' -pc2 (col. 1, lines 49-col. 3, line 53).

As to claims 15, 32 and 48, Ghazal et al., discloses wherein (c3) and (c4) are repeated while at least one table has at least one active, non-eliminated partition (col. 1, lines 49-col. 3, line 53).

As to claims 16, 33 and 49, Ghazal et al., discloses wherein the joining algorithm includes:

(c1) creating a file context, which stores at least location data for a row and a first value associated with the row, for each partition of the set of partitions to be joined;

(c2) determining the lowest first value stored by the file contexts that is equal to or greater than a particular hash value; and

(c3) identifying rows with a particular first value by reading the file contexts (col. 1, lines 49-col. 3, line 53).

As to claim 17, Ghazal et al., discloses a method of joining a first table tl and a second table t2, each table containing rows and columns and being divided into one or more partitions, the method including:

(a) calculating a correlation function between a first correlated value column of table tl and a second correlated value column of table t2, wherein calculating the correlation function includes:

joining table ti to table t2 using PK=FK as the join condition to produce a join result having rows, each row including a value from cv, and a value from cv2, wherein PK denotes a primary key column in table tl, FK denotes a foreign key column in table t2, cvl denotes a first correlated value column in table tl, and cv2, denotes a second correlated value column in table t2 (col. 1, lines 49-col. 3, line 53);

creating an initial running constraint (RC), the initial running constraint comprising a null range;

producing a derived constraint rule (DCR) having the following form:

(PK = FK) cv2 + CI <_ cvl <_ cv2 + c2,

where cl and c2 are constants, and "->" means "implies;" by performing the following processing for each row in the join result:

computing a new constraint (NEW), having a range; and

modifying RC by merging the range of NEW with the range of RC;

setting p equal to a size of a partition range of table tl and table t2;

determining a first correlation coefficient pcl which is equal to the value of (SIGN(cl) * CEILING(ABS(cl)/p)), wherein SIGN(cl) returns a value of -1 if cl is less than zero, otherwise SIGN(cl) returns a value of 1, ABS(cl) returns the absolute value of cl, and CEILING(ABS(cl)/p) returns a smallest integer that is equal to or greater than ABS(cl)/p (col. 1, lines 49-col. 3, line 53);

determining a second correlation coefficient pct which is equal to the value of (SIGN(c2) * CEILTVG(ABS(c2)/p)), wherein SIGN(c2) returns a value of -1 if c2 is less than zero, otherwise SIGN(c2) returns a value of 1, ABS(c2) returns the absolute value of c2, and CEILING(ABS(c2)/p) returns a smallest integer that is equal to or greater than ABS(c2)/p (col. 1, lines 49-col. 3, line 53);

(b) receiving a query requesting a join between table t1 and table t2;

(c) calculating a first number f1 and a second number f2, wherein f1 and fz denote the number of partitions of table t, and table t2, respectively, to be joined, wherein calculating f1 and f2 include:

setting n equal to pct - pc1 + 1;

determining a parameter m., which is a maximum number of file contexts;

setting f2 equal to the smallest integer value that is equal to or greater than the value of ((m-n)/2); and

setting f1 equal to n + f2 -1 (col. 1, lines 49-col. 3, line 53).

(d) determining a first starting partition number P1 for table t1 and a second starting partition number PZ for table tZ, wherein P, and PZ are calculated by setting PZ equal to a lowest partition number in t2 such that PZ is a first active, non-eliminated partition in table t2, and at least one of the partitions in the interval between PZ - pct and PZ - pc1 in table t1 is an active, non-eliminated partition (col. 1, lines 49-col. 3, line 53); and

setting P1 equal to PZ - pct;

(e) performing a joining algorithm, wherein a set of f2 partitions of table t2 starting at PZ are joined with a set of fl partitions of table tl starting at P1, wherein the joining algorithm includes:

creating a file context, which stores at least location data for a row and a first value associated with the row, for each partition of the set of partitions to be joined;

determining the lowest first value stored by the file contexts that is equal to or greater than a particular hash value; and

identifying rows with a particular first value by reading the file contexts;

(f) updating P1 and P2, wherein the updating P1 and PZ includes:

finding a lowest partition number P,' in t2 that is greater than or equal to the sum of P2 + f2 such that PZ" is a first active, non-eliminated partition, and at least one of the partitions in the interval between Pz - pcz and Pz" - pcl in table tl is an active, non-eliminated partition;

setting PZ equal to PZ ; and

setting P1 equal to PZ' - pct; and

(g) repeating steps (e)-(f) while at least one table has at least one active, non-eliminated partition (col. 1, lines 49-col. 3, line 53).

Prior Art Made of Record

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Cochrane et al (U.S. Patent No. 6,081,801);

Lohman et al (U.S. Patent No. 6,112,198);

Popa et al (U.S. Patent No. 6,567,802); and

Zait et al (U.S. Patent No. 6,609,131).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yicun Wu whose telephone number is 703-305-4889. The examiner can normally be reached on 8:00 am to 4:30 pm, Monday -Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on 703-305-3830. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-746-7240 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Yicun Wu
Patent Examiner
Technology Center 2100

June 16, 2004